"Utilizing Inland Waterway, Coastal and Open Ocean Barging of Containerized Agricultural Products to Overcome Existing Service Deficiencies and Increased Transportation Costs"

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Part II, Second Year Continuation

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FY04 FSMIP
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Executive Summary:

This report is the conclusion of a fascinating two-year exploration of examining the water option(s) for agricultural shippers to remain competitive in global markets. A great number of aspects of the project unfolded, not only the role of Pacific Northwest agricultural products in Asian markets, but also the flow of freight that enables outbound agricultural products to enjoy ocean rates considerably lower than inbound general cargo.

The unfavorable U.S. balance of trade for the last 20 years is forecast to continue, if not accelerate, as more manufacturing is moved off our shores to the Peoples Republic of China (PRC), SE Asia and as some forecast, India. However, the pressure to move ocean containers expeditiously back to offshore manufacturers has demanded the containers do not linger in the port hinterland, hence the ocean carrier will return it empty for the next eastbound cargo paying higher revenue to the ocean carrier. For example, the Port of Los Angeles reports that 64.5% or x TEU return empty.

The general scenario is that all West Coast ports ship out agricultural products, raw materials, recycled fiber and chemicals. These are lower revenue cargos to the ocean carrier with westbound ships at 40% capacity compared to eastbound at 80% capacity. Eastbound revenue per container compared to westbound can be a factor of 3-5 times higher. With eastbound cargos of electronics, auto parts, toys, etc., it is readily recognized the returning ocean containers for refill of high value products is paramount for an ocean carrier.

Brendan McCahill, Sr., President of PIERS at the Journal of Commerce Fifth Annual Trans-Pacific Maritime Conference at Long Beach during February 28 – March 1, 2005 reported the West Coast outbound (Westbound) liners cargos consisted of:

Paper and Paperboard (includes wastepaper)
Pet and Animal Feeds
Fabrics-raw Cotton
Mixed metal scrap
Logs and lumber
Wood pulp
Synthetic resins
Foam waste and scrap
Vegetables
Synthetic resins and plastics

The inbound (Eastbound) liner cargos consist of:

Furniture	Computers
Toys	Lamps and parts
Footwear	Women's and infant wear
Plastic products, Misc.	Hardware
Auto parts	Auto and truck; tires and tubes

Seaports Press Review of July 7, 2005 quoting Bill Mongelluzzo of the Journal of Commerce illustrates: "Some trans-Pacific carriers are rejecting low-value cargo. They'd rather send the containers back to Asia empty so they can be quickly refilled with better-paying shipments for the U.S. import market . . . Declining freight rates – some as low as $300 per FEU for wastepaper and other low-value commodities – are the result of a severe and persistent trade imbalance . . . U.S. containerized imports from Asia exceed exports by a ratio of 2.7 to 1".

Mark Page, Director of Research, Drewry Shipping Consultants at Long Beach reported: Average revenue Eastbound (to the West Coast) at $3772 per FEU and average revenue Westbound (West Coast to Asia) at $1640 per FEU.

Converse to revenue flows, ocean container export volumes from West Coast ports, such as Portland, are an order of 2 to 3 times the imports. Pacific Northwest (PNW) agricultural exporters are vaguely aware that capacity of PNW transcontinental railroads (and their port yards) is the determining factor on continuing containerized manufactured imports, which in turn keep outbound/westbound rates at a level permitting agricultural products to remain competitive in global markets.

With the congestion at Southern CA ports, carriers have dispersed container ship arrivals to Vancouver, B. C., Puget Sound, Manzanillo and Las Cardenas, Mexico as well as the Pacific Port of Balboa, Panama for rail across the Panama Ismus to the Atlantic port of Cristobal, thence U.S. Gulf and eastern seaboard ports.

At Appendix E, the flow of cargo into the West Coast is quantified by the Port of Lazaro Cardenas to include the amount forwarded to the Midwest and East coast from the Pacific ports. Kansas City Southern railroad has invested in Transportacion Ferroviarvia Mexicana for the purpose of

transporting containers from Asia to the Midwest.

As reported in the Pacific Shipper of March 7, 2005, page 110: "The basic rate on all-water services is about $900 higher than the port-to-port rate for deliveries to West Coast ports. The all-water rate is higher because of the longer transit time for the ships. That rate is more than offset, however, by the extra $1,500 to $1,800 carriers tack on for landbridge service because of the intermodal rates they pay the railroads as well as time they lose because they are unable to use containers. The Suez route has mainly been used for cargo originating in Southeast Asia and the Indian subcontinent, but carriers may look to it as an option for shipments coming from South China. Six of the 21 all-water services using the Port of New York and New Jersey arrive via the Suez. Another advantage of all-water services is that their schedules are more reliable . . . vessels using the all-water route usually arrive on the scheduled date, or at most one day late. Landbridge shipments, however, can be as much as a week late."

John Isbell, Director of Corporate Delivery Logistics, Nike, Inc. reported at Long Beach that the distance from Hong Kong to New York via the Panama Canal is 11,215 miles and via the Suez Canal 11,610 miles or a difference of only 395 miles.

This move to all-water could impact agricultural export rates since the inbound to the West Coast thence landbridge is higher paying revenue cargo. If the imports are reduced the shipline has little incentive to continue frequent callings and load with lower revenue westbound cargoes.

Moreover, as container ships continue to increase in size (9,200 - 10,000 – 12,000 TEU at present with plans for 14,000 TEU ships per Samsung Heavy Industries) and the resulting substantial lower cost per TEU, transiting the Panama canal will, in the long run, require enlarging the Panama canal, lest routing of larger ships will be all water via the Suez canal to the populous U.S. east coast and U.S. Gulf.

Since the sheer magnitude of containers hitting the U.S. shores in Southern CA is so impacting, the remaining two transcontinental rail carriers have started expansion plans for on-dock rail to continue moving 50% of the imports eastbound via Missouri/Mississippi crossings to the

remaining four eastern U.S. rail carriers.

This expansion diverts rail resources and investment from the PNW. PIERPASS at Southern CA ports is an effort to increase port productivity by economic incentives to deliver and remove containers in the off-peak weekday hours and weekends.

The Port of Vancouver, B.C. is expanding. Imports from the Port via Canada's two transcontinental railroads looks to be a longer-term option for eastern U.S. importers if Southern CA port efficiency is not increased as promised. U.S. port efficiency, hence throughput cost per TEU, is a factor in continuing West Coast import rail shipments to the Midwest and eastern cities.

There is the issue of U.S. public ports creating greater costs than global privately operated ports. Some would argue there is no role for public ocean ports, that private enterprises can fulfill the role. As reported in the American Shipper of May 2005 "The problem in the United States . . . is that the ports themselves are still in public hands", John Meredith, Managing Director, Hutchison Port Holdings.

Robert Sappio, Senior Vice-President, APL, Ltd. at Long Beach reported, "Asian ports are processing cargo at 18,000 TEUs per acre per year, while U.S. ports receive that cargo at a throughput capacity of 6,000 TEUs per acre per year or less. Deeper port drafts, new terminals and inland rail yards, extensive rail double-tracking, highway connectors in and out of harbor areas and other large capacity expansion projects are years out on the horizon."

What has been described above is that to understand the localized cost structure for agricultural exports, one has to know the global trade lanes of ocean carriers, the efficiency and capacity of ports, the capacity of U.S. rail carriers and indeed the ability of foreign countries, such as Panama, to undertake massive developmental projects.

The major retailers in the U.S., generally purchasing FOB in Asia, continually search water-rail and all-water options and when costs change sufficiently to accommodate change in transit time, the route(s) will be revised.

This two-year exploration with an objective of designing a plan of implementation, obtained its impetus from the regional inland PNW agricultural shippers under increasing transportation cost to ports for export. The assumption was the Snake-Columbia River system would provide the solution for those as far away from the West Coast as Montana. A corollary assumption was that agricultural shippers would obviously see that containers on barges would be their lowest cost option. Further, it was believed inland agricultural shippers and ports would seek out transportation options not for just the short run but visionary, strategic planning.

The local parties of interest not only discounted these assumptions, they were rejected nationally as well with the major modal shift to Short Seas Shipping seen as being "too risky". As reported in the Pacific Shipper of June 6, 2005, page 21: “The [Waterfront] Coalition also favors using scarce financial resources to expand existing rail and highway corridors before attempting riskier, unproven strategies such as short-haul rail shuttles and short-sea shipping.”

But there was illumination by one major Pacific Northwest forest products producer, who at the Umatilla, OR seminar stated that he used towboats for containers from Lewiston, ID to the Lower Columbia River thence ocean barge to Puget Sound. He stated the service was satisfactory and the reason the service was discontinued because their international client changed vendors.

Since neither short run nor strategic planning for the water option was in the Pacific Northwest embraced, this exceptionally fascinating look into the world of global cargo flows and its impact on the local scenario is coming to a close.

But a major step forward was achieved. The concept Articulated Tug/Barge (AT/B) for river and coastal movement of containers was cost modeled for those wishing to follow in this innovative mode to move agricultural products and commodities. The cost model compared containerized AT/B to trucking at 1000 and 2800 miles stage length.

The two cost models are shown in Appendix A-1 and Appendix A-2. The AT/B “particulars” are shown in Appendix H. A picture of the AT/B is shown in Appendix B.

We believe this work for USDA is a significant resource that will be implemented for the benefit of agricultural exporters in the unspecified future. It has expanded the edge of agricultural transportation knowledge, which in itself we believe is an appropriate expenditure of public funds.

One bright spot was the showing of one of the largest ocean container shiplines interest in the AT/B shortly after the presentation at Hilton Head, South Carolina at the Journal of Commerce Domestic Maritime Conference on April 11 – 12, 2005. The interest was an AT/B shuttle service along the Eastern Seaboard, such that the large containerships would have but few port calls. Since the AT/B is noted to be more dependable in meeting schedules in foul weather, the AT/B was looked upon as superior to the towed container barge shuttle service.

We have immensely enjoyed the journey and welcome others to look within for their own examination of the world of water agricultural transportation. And, we shall be pleased to help them along their own journey after this report is published.

We are indebted to USDA FSMIP and Transportation Services for their vision to support this undertaking.

Outline of issue or problem:

From the initial proposal to USDA, dated February 10, 2003:

Agricultural exporters in Oregon, Washington, Idaho and Montana utilize the Columbia/Snake River system whenever possible because of the lower transportation rates made possible by inland barge service. In a 2001 National Geographic article on the Columbia it was stated “Relatively inexpensive, Columbia River Basin barge shipping eases economic pressures on farmers as far inland as Montana and the Dakotas.” Glaring examples are: (1) pulses for India and Pakistan moving from Lewiston, Idaho (approximately 500 miles from Portland, Oregon) at $255 per forty foot ocean container on barge to Portland compared to $800 via truck and (2) fresh pears for Scandinavia and South America moving from Hood River, Oregon (a distance of 62 miles from Portland) to Seattle-Tacoma, Washington at a truck rate of $910 compared to $225 for container drayage, via barge, for a Portland loading. 100% of one of the three major

pear shipper's exports moves to Seattle-Tacoma for loading because of vessel callings (1).

The "leakage" of cargo off the Columbia/Snake River system is caused by the relatively small number of container ships calling on Portland, Oregon. As container ship lines put into service vessels approaching 7000 to 9000 TEUs, their port callings reduce to the few major ports on the West Coast such as Los Angles/Long Beach and Commencement Bay (Seattle-Tacoma). When this happens, agricultural exporters take deep discounts for using inland truck transportation. Rail is often not available with rail carriers preferring "wholesale" transportation contracts involving unit trains. The diversion of cargo (mostly agricultural products such as pulses, alfalfa hay in cubes or compressed bales and processed vegetables) from the Columbia/Snake River system is estimated at half of the total cargo available, approximately 37,600 TEU of a total of 75,200 TEU.

Also agricultural shippers off of the river, as in the Willamette Valley of Oregon (up to 100 miles from Portland to the city of Eugene), are paying an additional $300 per ocean container for movement from Portland, Oregon to Seattle-Tacoma to meet the sailing specified by the buyer. When grass hay has a value of less than $2500 per forty-foot ocean container, the additional $300 in inland transportation severely impacts the competitiveness of agricultural shippers in the world market place. Such U.S. agricultural products as alfalfa cubes and compressed bales at a value of less than $6000 per forty-foot ocean container must compete with Canadian competitors in the Asian market. Additionally, the movement by barge permits higher container loading (hence lower per ton transportation cost) and avoids the highway and bridge impact.

Although this proposal focuses upon containerized agricultural cargo on barge, it is relevant to note that the presence of barge service (i.e. competition) for bulk shipment of grain maintains a low rate for shippers. As an example, grain moving from the Pendleton area to export elevators in the Portland area (a distance of approximate 212 miles) via barge is 17.1 cents per bushel. The rail rate is 34 cents per bushel and the truck rate is estimated to be at least three times the barge rate. However, because of the high rate, no grain is shipped via truck. In the last crop year 156,000,000 bushels (4.2 million metric tons) of barley and wheat flowed down the Columbia to the export elevators via barge, which was

60% of the total flow. One could estimate the savings to agricultural shippers by the above comparison of barge to rail at $26,264,000.

In the situation for pears noted above at (2) with a difference of $685, this amounts to a significant impact based on the Oregon's most recent exports of 598,234 cartons.

Hence it is imperative that the efficiencies of barge for movement of agricultural commodities in the region remain a viable alternative to inland truck and rail to the major ports of export.

How the issue or problem was approached via the project:

Information was gathered from primary sources: tug-barge operators, naval architects, ports, U.S. importers and government agencies responsible for data collection. Secondary sources were conferences on cargo flows in the Pacific as well as Short Seas Shipping.

Conferences were organized for PNW agricultural exporters to explain the water option, the transport unit(s) needed, and the organization required to achieve the reduced cost of water transport by time-charter with a ocean tug-barge carrier.

A presentation was made at a national conference on domestic maritime transportation where the operating model of the Articulated Tug/Barge (AT/B) was presented. The national exposure of the concept AT/B was to corroborate the water transport option for PNW agricultural shippers. The presentation at the Journal of Commerce Domestic Maritime Conference at Hilton Head Island, South Carolina on April 12, 2005 is at Appendix B.

Because the existing AT/Bs are for petroleum and bulk commodities such as coal and grain, a concept containerized AT/B was needed to be designed by the Ocean Tug and Barge Company of Milford MA. The firm, having designed scores of AT/Bs, was confident their operating parameters would be parallel to previous AT/Bs (much like Boeing pre-selling a new model of an aircraft based upon Boeing's reputation in the aircraft industry).

The AT/B cost model was formulated to compare truck costs for stage lengths of 1,000 and 2,800 miles. This provided the data shippers and

receivers needed to evaluate the transport's applicability to their shipments.

Cost inputs came from Ocean Tug and Barge Company, The Inland Waterways Institute of the U.S. Army Corps of Engineers and local towboat companies. The cost and performance model is at Appendix A-1 for a 1000 statute mile stage length and Appendix A-2 for a 2800 statute mile stage length.

The essential element to achieve the lowest cost of agricultural product movement (at 40% of tariff) is time chartering of the AT/B for a specified period, usually one-year minimum. This arrangement reduces the risk to the AT/B operator and transfers the risk of maximizing the two way capacity of the 718 TEU AT/B to the shipper's association. By over-subscribing the AT/B, a shipper's association can reach 90% plus utilization. Since the default is to the current mode, truck, the members of the association would incur little impact by over-subscription.

When shippers tender freight individually then the scheduled ocean tug-barge assumes the risk of gathering revenue loads on both the headhaul and backhaul to cover round voyage cost.

For shippers that have over the past 20 years tendered containers without annual volume commitment, the joining of a shipper's association with penalties for not meeting annual volumes is a major concern, notwithstanding the potential for significantly lower rates.

Contribution of public or private agency cooperators:

Twenty-four ports provided input to the research regarding cargo flows and port operating costs. A great many were intrigued with the concept AT/B and looking forward to the application at their ports. Others questioned the ability of the AT/B to rapidly discharge and reload containers without a national maritime policy of creating Short Seas Shipping terminals that foster domestic maritime transportation.

Importers were asked questions about how they purchased goods from Asia, CIF or FOB. Almost all purchase FOB Asian ports, thus the importers routed and paid the freight bill. These were major importers, household names covering athletic shoes, building materials, toys, discount chains,

box stores, etc. Because they controlled the freight, they could direct the use of the AT/B for inbound cargo into the Columbia/Snake River system where distribution centers currently exist or could be built. This would balance the AT/B utilization having outbound agricultural containers.

Some ports on the Snake/Columbia River were concerned that application of an AT/B would cannibalize export cargoes carried aboard the only remaining ocean container carrier calling on the Port of Portland.

Ocean tug-barge operators, using dated tug towed barges were not committed to the containerized AT/B except for a major barge operator that has four petroleum AT/Bs in service.

A newly constructed ocean 1X4 barge (100' wide by 400' long) cost $10 million and a newly constructed tug at $1,000 per horsepower, hence a 5000 HP ocean tug would be $5 million. The comparable cost of a containerized AT/B would be $40 million (domestically built, complying with the Jones Act contrasted to foreign built at 30% less or $28 million) Thus the AT/B appeared to be excessive. However the difference for a tandem tow of equal TEU capacity would be $15 million and still not achieving neither the speed of the AT/B (13.5 knots vs. 9 knots) nor the high seas reliability of the AT/B for crossing the Columbia River bar.

Conventional tug towed barge operators have in service equipment that exceeds 30 years. Their fleets provide low cost service for commodities that can tolerate slow transit times and excessive weather days such as woodchips, sand and gravel that are inventoried in significant buffer stocks.

The existing conventional ocean going towed equipment is not sufficient for the contemporary agricultural product shippers, especially in the coastal movement in competition with trucks.

There is a significant gap that cannot be closed by this research and plan of implementation in the two-year time frame. Movement by inland and coastal water is trending down. Tug-barge operators are not opting for containerized AT/B because of the capital cost and the guaranteed volume needed to recover the investment however, companies are willing to commit capital for assist tugs (tractor, reverse tractor and cycloidal propulsion) for ship berthing.

Without the next generation of weather dependable AT/Bs, the present ocean tug-barge companies will have a limited number of commodities to move. The coastal modal shift from truck to water will have a scant change of any volume being removed from congested highways.

Results, conclusions and lessons learned:

This research was specific to water transportation and the findings were in many ways no different than other modal research, for example, speed is obtained by greater capital investment and greater fuel consumption.

However specific to water transport, the trade-off in port handling charges versus vessel operating cost is the roll-on roll-off (RO-RO) transport unit either self-propelled ship, towed barge or AT/B. RO-ROs are efficient in loading and discharge; no cranes or lift trucks are involved. But, the fully utilized capacity of the RO-RO is but two-thirds of the deadweight capacity of the vessel. Because trailers are on a chassis, approximately four feet of the unit is air. Also clearance between decks for movement of the trailers and the thickness of the decks themselves cause deadweight capacity to be lost.

Few could argue against the versatility of the towed deck barge. Loading can be by pass-pass forklift trucks or top-picks and discharge can be by the same forklift trucks carried on the barge to smaller ports having no unloading cranes or equipment. Towed barges are long-lived, capable of carrying a variety of oversize cargo (as well as containers) and are universally in service. They have the least capital investment one quick cost estimate is the cube of the barge times $10 per cubic foot, another method is pounds of steel times $1.50 per pound, analogous to building a home at $XXX per square foot. The drawbacks are speed, weather reliability and safety of crew.

As noted in the first report, self propelled ships are: higher in construction cost, higher in crew size, but faster in speed and more efficient in fuel consumption than the AT/B.

Port charges are a matter of numerous reports, debates and labor issues. Throughput charges for a 40' container can range from a low of $34 per container to $226 per container or more. These charges cover the discharge of the container from the hold (cell), placement in the dock

stack, and transfer from stack to truck chassis or railcar. Conversely they can cover the movement into the port, thence stack, and thence hold/cell.

An analysis was completed on whether the AT/B should travel up the Columbia/Snake River to Lewiston, ID with lesser FEU aboard to take advantage of the lower port costs and having 207 FEU not handled twice (207 FEU is the maximum with a 13' 6" channel depth). It was determined that because of the capital cost of the AT/B, that it is better to utilize the AT/B at or below Portland, Oregon. The loss in overall capacity was estimated to be 150 FEU (566 compared to 716 FEU) because of the lock dimensions on the Columbia/Snake River at 650 feet overall by 84 feet wide. Because there are currently containers moving on barges in tows with grain, petroleum, wood chips, etc. along the entire length, the utilization of the existing towboats would be cost effective even with the double handling of containers from barge to dock thence onto AT/B at a cost three times higher that up river smaller ports. The efficiency at sea of the AT/B overcame the double handling port charges.

Port charges may be subsidized by the public port for the general economic welfare of the community/region the port serves. Or, the port charges can extract "what the traffic will bear", namely on high value imported cargo. Ocean ports can be publicly owned or privately owned and operated, as is often the case in Asia and Latin America. It can be argued that public involvement in ocean ports is unnecessary and inefficient; that the time of public funds developing ocean ports is past, except for waterway and harbor dredging. Reported in the Pacific Shipper of July 11, 2005 was "A new law requires the port [Port Authority of Guam] to privatize the operations of the island's only cargo terminal."

What is advocated in this report is that for a modal shift from truck to water to occur, it is imperative that ports minimize the throughput charges for barging. Throughput charges need to be under $100 per 40-foot container.

In the case of high volume ports, ocean carriers negotiate the throughput costs and their cost can be substantially lower. In the case of CY-CY tariff rates, the throughput is imbedded; the shipper does not see the cost. However, when calculating FIO plus port charges for barging, the throughput is critical to competitiveness and may be incurred six times on a round trip voyage that includes inland waterways. The greater the

port charges, the longer the stage length must be to compete with trucks.

As stated above, unless there is a national transportation policy to develop efficient low cost Short Seas Shipping terminals within the major deep-water ports, the coastal volumes will most likely continue their decline vis-à-vis truck and rail. As reported in the Pacific Shipper of May 16, 2005, page 29, "New Rotterdam box terminal planned. The Delta Barge Feeder Terminal, which is due to open at the beginning of 2008, will handle small feeder ships and inland river barges, freeing up capacity for larger deep-sea container ships at other facilities also scheduled to come on stream that year."

It is difficult to report but necessary for the reader to understand that freight/cargo movement is a mundane sector that moves slowly, without significant innovations unless catastrophic economic conditions demand changes. Malcom McLean's containerized ocean innovation is over 40 years in the past. We have large container ships (9200 TEU) but the load/discharge method remains as with the past smaller size 2000 TEU ships (this is much like the rail car knuckle coupler). Computerized navigation systems (GPS) and ship's engineering monitoring systems are capable of reducing crew size but agreements of the past, as well as local ordnances, continue on.

For an outbound 40-foot container of hay at a rate of $1000 to Asia from the West Coast, a rate difference between export ports of $150 per 40-foot container can void the sale. At 56,000 pounds the $1000 rate is 1.8 cents per pound on a value of 9.1 cents per pound. For an inbound 40-foot container of consumer electronics at a rate of $3500 from Asia with a one-pound value of $10, the product can bear significant rate change when the CY-CY is 11.7 cents per pounds.

For the agricultural sector, transportation rates, both inland and ocean are critical to meeting global competition in foreign markets. One foreign purchaser of potato product from Idaho cited inland freight to West Coast export port the same as the ocean freight to his home country some 8,000 miles. Since he was also purchasing the same product from the EU, the FEU ocean rate from the West Coast was $600 above the EU rate made the West Coast product non-competitive with the EU.

Suggestions for further research needed:

As stated in the proposal for second year funding, if industry did not implement the barging plan then further research should be discontinued. With regret, we must comply, since both shippers and operators shied away from the plan.

Current or future benefits:

One objective of the two years of research was to identify how barging could benefit geographically transportation disadvantaged States and territories. The study identified that the time charter of an Articulated Tug/Barge could significantly reduce the rates shippers are paying for ocean transportation. The cost model in Appendix A-2 shows for a 2800 stage length that the FEU cost for a round trip voyage would be $1390 per FEU on a FIO basis and estimated ($2290 on CY-CY basis).

The 2800-mile voyage would be comparable to Pacific Northwest to Hawaii (2677 statute miles) thence 2599 statute miles to American Samoa. Also applicable would be round trip voyage of Pacific Northwest to Alaska (1414 statute miles). For Alaska and American Samoa the front haul would be foodstuffs, building materials, consumer goods, military goods (household for relocation of personnel) and transportation vehicles while the backhaul would be seafood, transportation vehicles and military goods. The headhaul to Hawaii would be the same and the backhaul to the Pacific Northwest would be agricultural commodities as well as transportation vehicles and military goods.

The round trip voyage time charter rate of $2290 per FEU compares to the Matson rate for foodstuffs of $4217 per FEU from West coast ports to Hawaii and the reverse for household goods of $2259 per FEU for a total of $6476 per FEU. There are an unlimited combination of headhaul and backhaul rates and commodities, but it is believed this comparison is representative.

Brad Dechter, President, Dependable Hawaiian Express, at the Domestic Maritime Conference, Hilton Head, South Carolina, April 11-12, 2005 reported the freight all kinds (FAK) rate to Hawaii for a forty-foot dry container at $6,046 and from Hawaii at $4,327 for a total of $10,373. He

cited a lack of competition as the reason for the high rates compared to other trade lane rates as follows:

FEU FAK	West Coast to Japan $1,175
	Japan to West Coast $3,075
	West Coast to Hong Kong $730
	Hong Kong to West Coast $2,845

Brad Dechter provides an analysis of the West Coast – Hawaii rates and service; please see Appendix G.

As stated in the Executive Summary, we believe the body of knowledge on the water transportation option has been documented beyond what the industry has developed for itself except for the Institute for Water Resources of the U.S. Army Corps of Engineers and the Short Seas Shipping Cooperative Program with the National Ports and Waterways Institute, University of New Orleans. The envelope of knowledge has been pushed out; the cost model that was developed was thought to be avant-garde by some operators. Thus, one can derive that the ocean tug-barge industry is composed of two classification of operators: (1) those of family lineage passing the controlling management from generation to generation with "experience" guiding the business model and (2) those with extensive financial management, knowing operating costs precisely, but not wishing competitors to know of operating performance and costs. The cost model developed in this research is of benefit to the former.

Because the barge industry is low profile, few studies have been undertaken except as noted above. The profile of handling equipment and techniques of operation will be of benefit to small port operators; those with limited capital for container crane investment.

A third category of beneficiaries could be truck lines of vision. Like those enlightened to use trailer on flatcar for transcontinental moves, truck lines can use barge in coastal operations with tractors stationed at initial and destination ports for drayage/shorthaul.

And, of course, "should the other shoe fall" i.e. if the last ocean carrier pulls out of the lower Columbia River, shippers will clamor for instantaneous rate relief as inland truck rates to export ports adjust to not having towboat competition from Lewiston, Idaho to Portland, Oregon.

A report, "Breaching the Lower Snake River Dams: Transportation Impacts in Oregon" by HDR Engineering, Inc., February 2000, identified the transportation rates (FEU) from Lewiston, Idaho to Pacific Northwest Export Ports at page 10:

Truck to Puget Sound	$650
Truck to Portland	$700
Truck/Barge Pasco to Portland	$625
Rail to Puget Sound	$550
Rail to Portland	$550
Barge to Portland	$250

At that juncture, shippers will want short run solutions, most likely tandem towed ocean barges with perhaps more winter weather consequences such as happened on the Columbia River bar to the Millicoma as shown in Appendix C. We, of course, hope this will never happen again.

Additional information available:

An excellent quantification of the external costs of trucking (or in other terms the public benefits of water transportation) was developed by the National Ports and Waterways Institute, University of New Orleans, November 2004, for the Short Sea Shipping Cooperative Program.

The report titled "The Public Benefits of the Short-Sea Intermodal System" at page 49, Figure 39: Estimated Total External Cost Savings, Ferry Service, NYC – Miami [1245 miles] calculated:

Infrastructure external costs	$84.41 per one-way trip of 1245 miles
Air Pollution external costs	$48.56
Congestion external costs	$173.97
Noise external costs	$21.96
Accident external costs	$144.67
Total External Costs	**$475.16**

The report identifies for the U.S. the equivalent of what the European White Paper did for the EU and is a major effort to assess the full impact of using truck for cargo movements.

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Operating Cost Estimate of Articulated Tug-Barge "Oregon"
Jones Act Compliant
Pacific Coast voyage of 1000 miles stage length

Input Data:

1) 12,000 HP total for 2 EMD Engines
2) Fuel #2 Diesel at 0.903 gallon per HP per 24 hours (service rpm); 10,836 gallons per 24 hours for propulsion; with generators and incinerator 11,057 gallons per 24 hours
3) 8400 LT lightship weight barge construction at $1.50/pound for $27,720,000
4) 12,000 HP Tug construction at $1000/1 HP for $12,000,000 (USACE)
5) Maintenance and Repair/Dry Dock $660,000 per year
6) Insurance $930,000 per year
7) Insurance Deductible Reserve $105,000 per year
8) Supplies and Miscellaneous $103,250 per year
9) Property Tax $397,200 (1% of value)
10) Return on Capital (12.5% USACE) $4,965,000
11) Crew Food $50 per 24 hours
12) Crew (24 hours, 8 day RT Columbia River to LAX/LB, 6 days running and two days stand-by)

a) Captain 1: $100,000 plus 30% benefits	$130,000
b) Captain 2:	$130,000
c) Engineer 1: $93,500 plus 30%	$121,500
d) Engineer 2:	$121,500
e) First Mate 1: $90,000 plus 30%	$117,000
f) First Mate 2:	$117,000
g) Second Mate 1: $80,000 plus 30%	$104,000
h) Second Mate 2:	$104,000
i) Able Body Seaman 1: $65,800 plus 30%	$85,500
j) Able Body Seaman 2:	$85,500
k) Able Body Seaman 3:	$85,500
l) Able Body Seaman 4:	$85,500
m) Ordinary Seaman/Cook 1: $52,000 plus 30%	$67,600
n) Ordinary Seaman/Cook 2:	$67,600
Annual Crew Cost	$1,422,200

13) 343 operational days per year (12 holidays and 10 bar closure days)
14) 13.5 knots, 365 statute miles per 24 hours, 1000 SM in 3 days (2.74)
15) 24 hours loading/unloading Columbia River; 24 hours U/L LAX/LB
16) 42 RT voyages per year from Columbia River to LAX/LB (1000 SM)
17) Head haul to LAX/LB 718 FEU at 90% for 646 FEU

18) Back haul to Columbia River at 100% for 718 FEU (Empty Container Fill)
19) 57,288 FEU per year at 42 voyages
20) $39,720,000 20 year loan at 8% for annual P&I payment of $3,986,808

Fixed Costs: (per year)

1) Principal and Interest Payments		$3,986,808
2) Maintenance and Repair/Dry dock		$660,000
3) Insurance		$930,000
4) Insurance deductible reserve		$105,000
5) Supplies and miscellaneous		$103,250
6) Property tax		$397,000
7) Return on Capital		$4,965,000
Fixed Cost Total		$11,147,258
Per Operational Day (343 days)		$32,499

Variable Costs:

1) Crew per year		$1,422,200
Per day (365 days)	$3,896	
Food	$50	
Per day total	$3,946	
2) Fuel Running per year (252 days) @ $1.65 per gallon for $17,879 per 24 hours 12,000 HP @ 0.903 for 10,836 gallons with generators and incinerator for 11,057 gallons per 24 hours		$4,505,508
3) Fuel standby per year @ $1.65 per gallon for $365 per 24 hours 221 gallons per 24 hours		$30,660

Voyage Costs:

1) Columbia River loading day 1		$36,810
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$365	
2) Enroute day 2		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
3) Enroute day 3		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
4) Enroute day 4		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
5) LAX/LB unload/loading day 5		$36,810
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$365	
6) Return enroute day 6		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
7) Return enroute day 7		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
8) Return enroute day 8		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	

Voyage Cost per FEU: $295 one-way

1) 1364 FEU per RT voyage
2) $401,754 RT voyage cost
3) $241 running cost per FEU
4) $54 standby cost per FEU
5) $191 fixed cost per FEU ($32,499 x 8/1364)
6) $81 fuel cost per FEU ($110,194/1364)
7) $23 crew cost per FEU ($31,568/1364)

Operating Cost Estimate of Articulated Tug-Barge "Oregon"
Jones Act Compliant
Pacific Ocean voyage of 2800 statute miles stage length

Input Data:

1) 12,000 HP total for 2 EMD Engines
2) Fuel #2 Diesel at 0.903 gallon per HP per 24 hours (service rpm); 10,836 gallons epr 24 hours for propulsion; with generators and incinerator 11,057 gallons per 24 hours
3) 8400 LT lightship weight barge construction at $1.50/pound for $27,720,000
4) 12,000 HP Tug construction at $1000/1 HP for $12,000,000 (USACE)
5) Maintenance and Repair/Dry Dock $660,000 per year
6) Insurance $930,000 per year
7) Insurance Deductible Reserve $105,000 per year
8) Supplies and Miscellaneous $103,250 per year
9) Property Tax $397,200 (1% of value)
10) Return on Capital (12.5% USACE) $4,965,000
11) Crew Food $50 per 24 hours
12) Crew (24 hours, 18 day RT Pacific Northwest to Hawaii, 8 days running and two days stand-by)

a) Captain 1: $100,000 plus 30% benefits	$130,000
b) Captain 2:	$130,000
c) Engineer 1: $93,500 plus 30%	$121,500
d) Engineer 2:	$121,500
e) First Mate 1: $90,000 plus 30%	$117,000
f) First Mate 2:	$117,000
g) Second Mate 1: $80,000 plus 30%	$104,000
h) Second Mate 2:	$104,000
I) Able Body Seaman 1: $65,800 plus 30%	$85,500
j) Able Body Seaman 2:	$85,500
k) Able Body Seaman 3:	$85,500
l) Able Body Seaman 4:	$85,500
m) Ordinary Seaman/Cook 1: $52,000 plus 30%	$67,600
n) Ordinary Seaman/Cook 2:	$67,600
Annual Crew Cost	$1,422,200

13) 343 operational days per year (12 holidays and 10 bar closure days)
14) 13.5 knots, 365 statute miles per 24 hours, 2800 SM in 8 days (7.67)
15) 24 hours loading/unloading Pacific Northwest; 24 hours U/L Hawaii
16) 19 RT voyages per year from Pacific Northwest to Hawaii (2800 SM)
17) Head haul to Hawaii 718 FEU at 90% for 646 FEU
18) Back haul to Pacific Northwest at 100% for 718 FEU (Empty Container Fill)
19) 25,916 FEU per year at 19 voyages
20) $39,720,000 20 year loan at 8% for annual P&I payment of $3,986,808

Fixed Costs: (per year)

1) Principal and Interest Payments		$3,986,808
2) Maintenance and Repair/Dry dock		$660,000
3) Insurance		$930,000
4) Insurance deductible reserve		$105,000
5) Supplies and miscellaneous		$103,250
6) Property tax		$397,000
7) Return on Capital		$4,965,000
Fixed Cost Total		$11,147,258
Per Operational Day (343 days)		$32,499

Variable Costs:

1) Crew per year		$1,422,200
Per day (365 days)	$3,896	
Food	$50	
Per day total	$3,946	
2) Fuel Running per year (252 days) @ $1.65 per gallon for $17,879 per 24 hours 12,000 HP @ 0.903 for 10,836 gallons per 24 hours with generators and incinerator for 11,057 gallons per 24 hours		$4,505,508
3) Fuel standby per year @ $1.65 per gallon for $365 per 24 hours 221 gallons per 24 hours		$30,660

RT Voyage Costs:

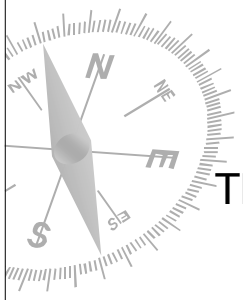
1) Pacific Northwest loading day 1		$36,810
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$365	
2) Enroute day 2		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
3) Enroute day 3		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
4) Enroute day 4		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
5) Enroute day 5		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
6) Enroute day 6		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
7) Enroute day 7		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
8) Enroute day 8		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
9) Hawaii unload/loading day 9		$36,810
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$365	

10) Return enroute day 10		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
11) Return enroute day 11		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
12) Return enroute day 12		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
13) Return enroute day 13		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
14) Return enroute day 14		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
15) Return enroute day 15		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
16) Return enroute day 16		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
17) Return enroute day 17		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	
18) Return enroute day 18		$54,689
a) fixed cost	$32,499	
b) crew cost	$3,946	
c) fuel cost	$18,244	

Voyage Cost per FEU: $695 one-way

1) 1364 FEU per RT voyage
2) $948,644 RT voyage cost
3) $642 running cost per FEU
4) $54 standby cost per FEU
5) $429 fixed cost per FEU ($32,499 x 18/1364)
6) $215 fuel cost per FEU ($292,634/1364)
7) $52 crew cost per FEU ($71,028/1364)

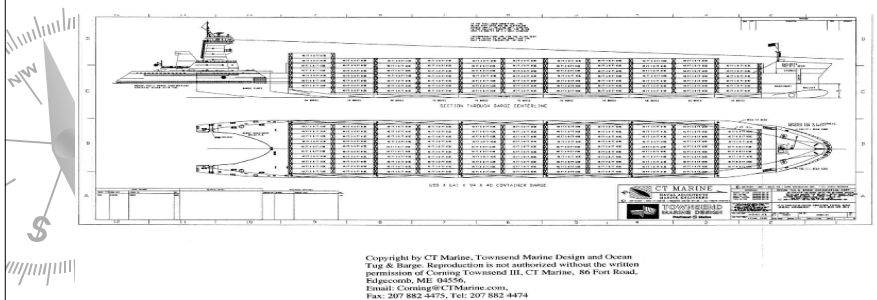
The Articulated Tug/Barge



A Transport Unit
To Implement
The U.S. Short Sea Shipping Initiative

Cellular Container AT/B

1436 TEU
729' Unit LOA 94' Beam 23' Loaded Draft
12,000 HP 13.5 Knots



Reinauer AT/B Operating in a Winter Storm off Cape May, NY in Seas Well in Excess of 20 feet

Courtesy of Ocean Tug and Barge

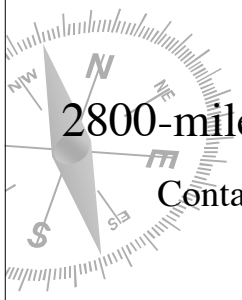
AT/B Efficiency

- Smaller Crew Size than Self-Propelled Containerships
- No Bar or River Pilots
- No Assist Tug
- Construction Costs Considerably Less than Self-Propelled Containerships

Cost Comparison to Truck
Door to Door

1000-mile Voyage

Containerized AT/B at 75 percent of Truck Cost



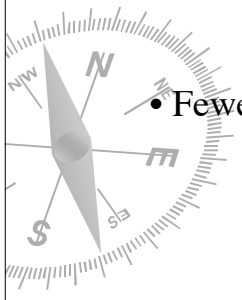
2800-mile Voyage

Containerized AT/B at 51 - 69 percent of Truck

Dry Dock Flexibility

Separable Units of the AT/B

- More Dry Docks for the Tug (137)
  Propulsion and Rudder Repair
- Fewer Dry Docks for 400+ feet Ship (28)



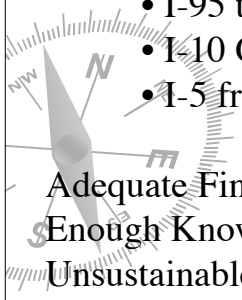
Public Policy Issues

Few Know of the Water Option to Carry a Wide Variety of Cargo in lieu of Truck

Candidate corridors

- I-95 thence to Puerto Rico
- I-10 Gulf of Mexico
- I-5 from Vancouver, B.C. to the Mexican border

Adequate Financing of the Highway Mode, but Not Enough Know that the Highway Mode is Basically Unsustainable Compared to the Water Mode



Public Policy Issues

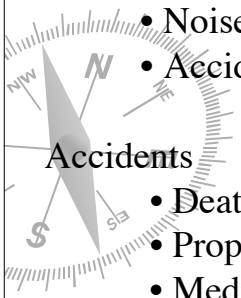
Shippers Have Been Enjoying the Speed of Highway at a Subsidized Cost Borne by the General Taxpayer

Fuel Taxes, Registration Fees and Weight-mile Fees Do Not Cover the Cost Responsibility for Highway Construction and Maintenance Attributable to Large Trucks

Public Policy Issues

External Costs of Highways Not Transparent

- Infrastructure Modification and Maintenance
- Air Pollution
- Congestion
- Noise
- Accidents



Accidents

- Death and Suffering
- Property Damage
- Medical Payments

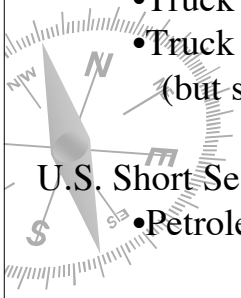
Public Policy Issues

The Public Relations Theme:

"If you got it, a truck brought it"

Is Not Exactly True

- Rail moves 40 percent (T-M)
- Truck moves 29 percent (T-M)
- Truck moves 71 percent of the tons (but shorter distances)



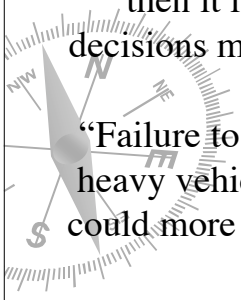
U.S. Short Sea Shipping Moves 7.3 percent (T-M)

- Petroleum, Sand and Gravel and Forest Products

Public Policy Issues

OREGON DEPARTMENT OF TRANSPORTATION
RESEARCH GROUP

"If the cost is not paid directly by the decision-maker, then it is likely to be ignored; and the resulting decisions may impose costs that exceed their benefits"



"Failure to accurately price the use of roads for some heavy vehicles may divert commodities to trucks that could more efficiently be moved by rail or other forms of transportation"

Conclusion

Cost estimates indicate that the AT/B is commercially viable without subsidy

The challenge is to have shippers, the general public, government agencies and legislatures re-think modal resource allocation to include a different perspective of the water option

Project has been funded by USDA FSMIP Program

MOTOYA NAKAMURA/THE OREGONIAN

The oil barge Millicoma founders in the surf below the North Head Lighthouse near the mouth of the Columbia River. Removing the barge could take at least two days.

Appendix D

FY04 FSMIP Six Months Report

Briefly summarize activities performed and milestones achieved for each objective or sub-element of the project.

Research on the volume of freight in the Pacific littoral has been completed.

Also a concept design for the containerized articulated tug-barge (ATB) has been completed and estimated costs of operation have been prepared.

A major shipper event was held in August 2004 where the presentation described barging as an option to agricultural shippers.

A second shipper meeting was held in the first quarter of 2005 at Umatilla, Oregon for inland shippers.

Regarding freight flows into and along the Pacific littoral, China remains the major source of cargo (with Hong Kong it will account for 80% and the forseeable future). LAX and Long Beach are anticipating the majority of the cargo but transcontinental rail capacity is limited and shippers are looking for overflow ports to include Mexico.

The Pacific Northwest was cited as having port capacity, but rail capacity for onward movement to the populous sections of the Midwest and East is not available according to major operating companies.

Of the volume discharged the following estimates are for retained cargo (consumed in the port hinterland) and transloaded for rail to the Midwest/East:
LAX and Long Beach 50% retained and 50% railed to points past the Missouri and Mississippi Rivers; Oakland 85% retained and 15% railed onward; Seattle-Tacoma 30% retained and 70% railed onward. Vancouver, B.C. 85% retained and 15% railed onward; San Diego is

not a player; Portland is not a player; Manzanillo, Mexico is growing with KCS Railroad having purchased the controlling share of one of the two Mexican railroads. Imported containers move to Larado, Texas thence St. Louis.

AT/B drawings and costs of operation were provided to USDA Transportation and will be included in the final report.

Trans-Pacific revenue volume is 80% container slots filled on the imports to the U.S. (eastbound movement from Asia) and 40% container slots filled on the exports to Asia from the U.S. (westbound movement from the U.S.).

West Coast ports export volume is low value commodities with a FEU rate generally under $1000. Imports are high-value manufactured goods such as electronics (furniture is the largest volume) and rates for FEU from $3000 to $5000. There is a distinct possibility that any delays in loading revenue cargo for return of ocean carriers to Asia for re-loading high freight paying cargoes will leave agricultural shippers in a difficult position. The implication is that shuttling of export containers to hub ports may help agricultural shippers overcome this macro factor in the Pacific.

Note unexpected delays or impediments as well as favorable or unusual developments.

There was an unusual development. Shippers are shying away from the barging option because of believed "cannibalization" of the cargo for the last remaining ocean carrier in the Columbia River.

The shippers were assured that the effort is to bring cargo back to the Snake-Columbia River that is now "leaked off" to Seattle-Tacoma ports via rail and truck (estimated at 50% of the total cargo available and suitable for barge-ocean ship exporting). It is important that the project continue, there have been discussions of ocean carrier schedule changes. If so, the project will move to first priority for ag shippers and others that contribute cargo to "fill-out" the AT/B.

As discussed via telephone with FSMIP and USDA Transportation,

the AT/B was designed to overcome the skepticism created by towed barges across the Columbia River bar during heavy seas. The AT/B also provided hard data for cost calculations then were more "theoretical" without the design. The design, performance data and operating costs will add to USDA's library or resources for ag shippers.

Outline work to be performed during the succeeding period.

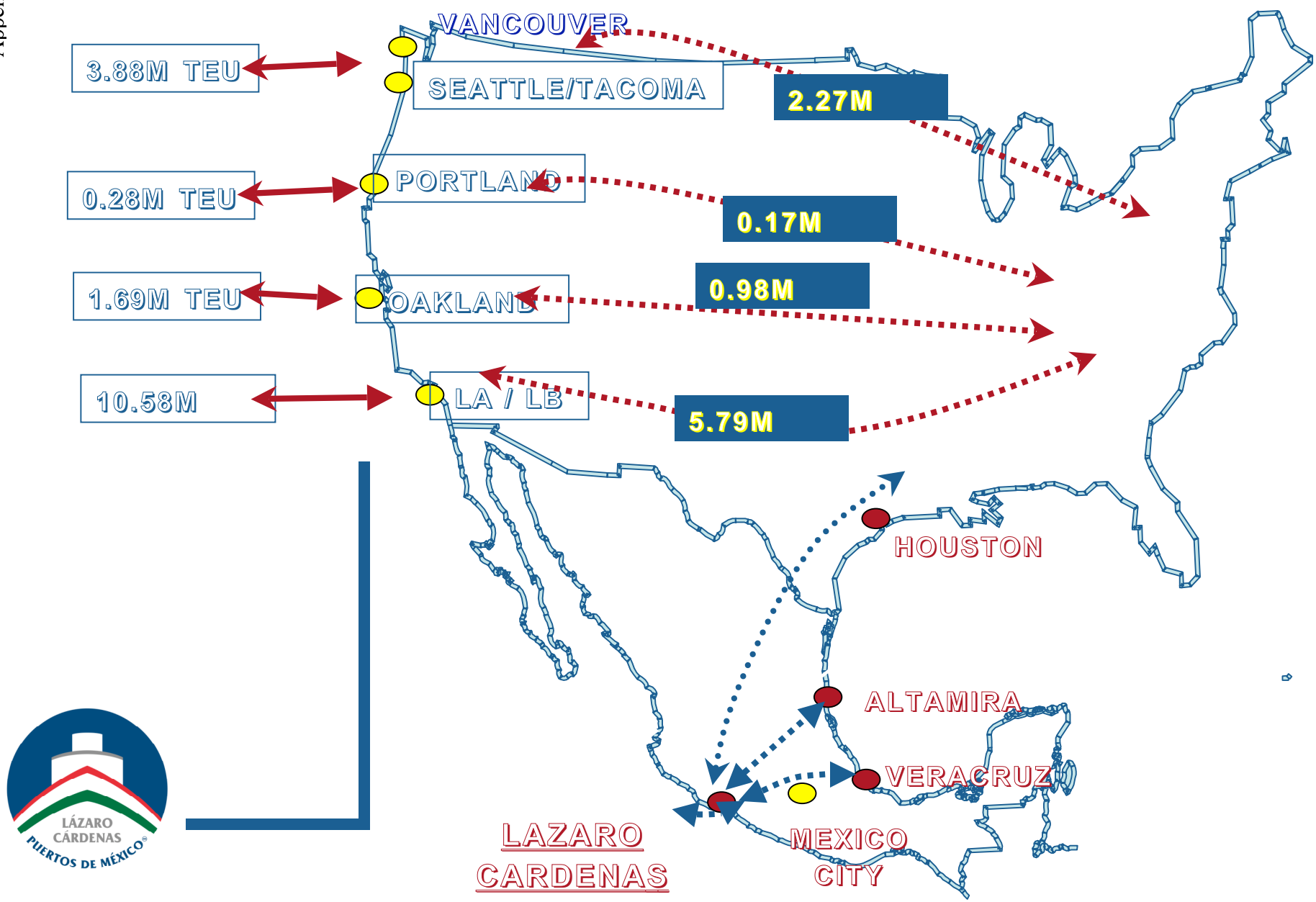
The cargo volume will be quantified. Additional shipper meetings will be held. A presentation on April 11-12, 2005 to a Domestic Maritime Conference organized by the Journal of Commerce will be presented. This will provide national attention to the AT/B and barging alternative and reach many agricultural shippers that have distribution management outside the Pacific Northwest.

Comment on the level of grant funds and matching contributions expended to date on the project.

It is estimated that 75% of the funds have been expended.

Appendix E

Potential North American Market for Lazaro Cardenas Port



Volume of Cargo at Pacific Coast Ports

In 2003 the total U.S. liner trade was 21,500,000 TEU of which inbound was 14,2000,000 TEU (66%) and outbound 7,300,000 TEU (34%). The forecast for 2006 by PIERS Maritime Research Services is 19,000,000 TEU inbound (69%) and 8,600,000 TEU outbound (31%).

In 2003 the Trans-Pacific liner trade was 12,700,000 TEU, which was 59% of total U.S. liner trade. PIERS forecast the Trans-Pacific liner trade to be 62% in 2006.

Brenden McCahill, Sr., President, PIERS, reported at Long Beach: "By now it has become obvious to industry players that the Trans-Pacific trade, and more specifically, China, has emerged in recent years as the most important market for U.S. imports, easily surpassing the European trade. . . the Trans-Pacific as five countries in Northeast Asia: China, Hong Kong, Japan, Korea and Taiwan and five countries in Southeast Asia; Indonesia, Thailand, Malaysia, the Philippines and Singapore. . . the Trans-Pacific trade was and will continue to dominate.

Noted in the Pacific Shipper of July 4, 2005: "California's highways, railroads, ports and airports are used to move more than 40 percent of all goods that enter or leave the country."

Port	Annual TEUs			Year
	Imports	Exports	Total	
Hueneme, CA	58,478[c]	2,189[c]	60,667	2004
Panama Canal	2,862,315[a]	2,963,037[b]	5,825,353	2004
Portland, OR	71,504	203,742	275,246	2004
Seattle, WA	704,664	387,503	1,775,858[d]	2004
Tacoma, WA			1,798,000	2004
Los Angeles, CA	4,003,781[e]	3,317,659[f]	7,321,440	2004
Long Beach, CA	2,987,980	1,007,913	5,779,852[g]	
Oakland, CA	691,004	814,123	2,044,594[h]	2004
Vancouver, BC			1,664,906[i]	2004
[Vancouver, BC	713,083	615,542	1,539,058[j]	2003]
Hawaii			1,078,902	2002
Manzanillo, MX			707,404	2003

a) From Pacific Ocean to Atlantic Ocean
b) From Atlantic Ocean to Pacific Ocean
c) Reported in Metric Tons; converted at 11 MT per TEU
d) International empties 374,084; Domestic 309,607 (Alaska and Hawaii)
e) 63,361 empties
f) 2,187,779 empties
g) 1,783,959 empties
h) 539,467 empties
i) Foreign containers
j) 35,168 empties inbound; 175,265 empties outbound

Competition (or Lack Thereof) in a Trade Lane with Only Two Competitors

By Brad Dechter, President, DHX- Dependable Hawaiian Express

General

If you are a shipper moving product by container load to Hawaii, you probably know that there are only two ocean carriers serving Hawaii — Matson Navigation Co. and Horizon Lines. If you talk to these carriers, and ask them to bid on your business, they will act like they are interested, take down all your facts and figures, and tell you they will "sharpen their pencil" and give you a rate. Which they will. They may even come back to you a few times and adjust their quotes, if you push them for a better rate. In the end, you may feel you bargained hard and got a good "deal" and be happy about the results of your efforts.

If you try to go a different option, and talk to a freight forwarder, and you are located east of the Mississippi River, the forwarder *may* do better price-wise. But, from the West Coast port cities, the forwarder will be hard-pressed to match the carrier's rates. This is because in a duopoly, especially in the state it exists today, there is no reason for the ocean carrier to help the forwarder (or the beneficial cargo owner). Only when there are a multiple of ocean carriers attempting to maximize profits in a trade lane or are forced to truly compete are the forwarders decisions as to who they use important to the carrier particularly when the two carriers are not competitors, but what I call "peaceful coexisters."

The trade lane

You need to have better knowledge of the Hawaii trade lane to understand that a lack of true competition exists in this trade lane. You have Matson Navigation Co. (Matson), one of the most profitable ocean carriers worldwide, who control 70 percent of the business going to Hawaii. We, at DHX (Dependable Hawaiian Express), know them well. We believe we are their largest single customer. Matson has recently invested in two new ships and is in the process of buying two more ships. They own a substantial portion of the company stevedoring their ships, they operate their own freight terminals, and they own their own barges in Hawaii. In other words, they vertically control the quality of their service, from beginning to end. They also own their own intermodal company, so they control the rail aspect of their moves to the West Coast.

The competition to Hawaii that Matson faces has always been weak. This goes back to 1968 when Seatrain Lines entered the Hawaii market. Matson ended this competitive threat by buying Seatrain in 1974. U.S. Lines then took over as Matson's competitor, and U.S. Lines then went bankrupt in 1986. Sealand Services took over in 1986. Sealand, owned by the railroad CSX, was split up in December of 1999 and the international portion of the business sold to Maersk. The domestic ocean carrier portion of Sealand was then renamed/reincorporated as CSX Lines. CSX Transportation subsequently sold CSX Lines to the Carlyle Group in February 2003, which renamed the service Horizon Lines. After one year, Carlyle resold the ocean carrier to another private investor, Castle-Harlan — and Carlyle made a $300 million profit turning over the company after approximately one year. Through all these ownership changes, it is important to realize that no real money was spent on new ships within the Hawaii trade lanes — there was no capital investment in new vessels. Sealand purchased U.S. Lines'4 old ships and used those. Horizon Lines took over the Sealand ships. The average age of a Horizon Lines

vessel to Hawaii is 28 years old.

Horizon currently uses a "turnkey approach" to Hawaii. They use CSX Transportation for intermodal work, they use Maersk terminals and facilities to stevedore their vessels (except in Hawaii where they operate their own terminal) and they use Young Brothers Barges to move the freight to the outer islands in Hawaii. In other words, they don't use their own operations to control the quality of their base business. During any Christmas season, should you use Horizon Lines, there is the good chance your freight to the outer islands will be delayed. Why? Because Young Brothers takes care of the higher paying local customers first.

Why is the above important? Because in a trade lane with only two carriers, if one of them consistently underperforms the other and does not "rise" to the level of competition, then you have no real competition, particularly when the rates each carrier charges is identical to the other. Of course, the fact that Matson fought so hard to keep APL out of the trade lane in the late 1980s, and they recently paid $30 million more than they previously had to purchase their last two ships and, by doing so, keep another new competitor out of the Hawaii trade lane, tells us all that they know they've got a good business and they want to keep it that way with no real competition. Matson has done well for themselves with their strategic planning, so we do need to give them credit and admiration for what they have accomplished.

Impact of no competition on freight-forwarder pricing

The above industry framework impacts the way that the freight forwarder is treated in Hawaii, and helps keep the ocean pricing to Hawaiian consumers artificially high. In Alaska and Puerto Rico, where there are varying levels of ocean service among three or more carriers, the forwarders are given confidential contracts based on their volumes to destination. The forwarders can then control how the freight is moved, with what carrier, to maximize service to the customer, as well as their own profits. These contracts allow the forwarders to give different pricing structures based on the level of service required, and also reduce the cost of the freight to the smaller shipper.

In Hawaii, the forwarders have no contracts — Matson and Horizon refuse to do this because they look at it as a way of reducing their profits and allowing someone else to control what they consider "their freight." (In my opinion, if there were a third carrier, they wouldn't be able to consider it their freight.) Hence, a forwarder like DHX-Dependable Hawaiian Express, who may be shipping 10,000 containers a year to Hawaii, pays the same price as the shipper shipping a single container to Hawaii. There is also no price differentiation based on quality of service — Matson sets the prices and Horizon matches it. Over the past seven years, Matson and Sealand, and CSX and Horizon have walked virtually "lock step" together through rate increases, fuel surcharge increases, hazmat surcharges and a new terminal handling charge. There is no difference in price and Horizon can't compete based on service.

Matson must realize this; they have worked with Horizon Lines to try to ensure Horizon Lines can at least offer some levels of service that appear competitive:

On Oct. 16, 2000, CSX Lines announced a mid-week service from Los Angeles to Hawaii called the "Midweek Express." Matson already had such a service.

On July 20, 2001, Matson and CSX announced they had entered into an "extension" of a prior existing agreement and thereafter CSX Lines ceased operations as a vessel carrier of the Midweek service and began to compete with Los Angeles-based freight forwarders as a freight forwarder. (It is rumored that CSX was paying Matson roughly $1,500 per

container for the same freight other forwarders must pay Matson more than $4,000 for). Matson provides Horizon with 140 slots per sailing under this arrangement. CSX Lines discontinued its own vessel service thereby reducing capacity and making Matson the only vessel carrier providing the Midweek service. At the same time, Horizon was able to reduce its vessel rotation, reducing costs and increasing profits in the trade lane as well as for themselves.

As a result, CSX Lines, and now Horizon Lines, conduct business de facto as a freight forwarder, using Matson's vessel service. Matson is providing Horizon Lines with volume pricing contracts but refuses these same contracts to other freight forwarders such as DHX-Dependable Hawaiian Express.

The point is, the "competitor" is a customer, and one who has extremely preferred rates.

Impact of no competition on nonforwarder pricing

You should also learn there are contracts to certain customers of Matson and Horizon Lines. The ocean carriers may tell you they don't have them but they do. They call them "Memorandums of Understanding." They even publish them in a "secret tariff" that exists that neither refer to on their Web sites, one that each of them subscribes to of their competitors tariffs, so that Horizon and Matson do nothing to reduce potential profits in the overall marketplace and which allows them to regulate the overall pricing in the trade lane. Through this mechanism, since they both are asked to bid and normally know the volumes and service requirements of the customer, they have developed the unique skill of categorizing accounts with larger volumes into certain pricing levels, hence regulating the overall market profitability between them. Talking to others in other domestic trades, I have noted this is fairly common. The domestic offshore trades have become oligopolies under which price leadership is effectuated by means of exchanging pricing information through tariffs and tariff filings. Taking an example out of Matson's Tariff 2034 (the "secret tariff") or the Horizon equivalent, Costco comes to mind. If a specific city is named with certain commodities to be shipped, and the rate applies only if 30 containers a week or more are shipped, it is virtually a contract. (The old adage if it looks like a duck and walks like a duck and smells like a duck, then it is probably a duck, applies here.)

The carriers publish the rates to signal one another what they have negotiated with a customer. This sets the boundaries for future customers that may arise with similar volumes-commodities. The other carrier then publishes the same commodity, acknowledging the pricing framework, even though the potential customer will never use them. This is totally contrary to the practices in any international trade lane.

Industry sources informed me that the combined westbound sailings of Matson and Horizon to Hawaii in 2004 were at 94 percent capacity. Thus, without any competition, there is no reason, incentive or logic for Matson and/or Horizon Lines to reduce pricing. A 1995 U.S. Department of Transportation report found that competition under ICC regulation was actually working to establish the price and rates structures in the domestic trades. This same report found that the Federal Maritime Commission had investigated rate levels in the Hawaii trade only twice between 1985 and 1990 and found on each occasion that the rates were too high. The ICC, on the other hand, did not regulate carrier rates beyond the filing of tariffs.

DHX-Dependable Hawaiian Express also did studies. Our analysis of the Hawaii rate structures showed that from 1994-1998 the industry had competition based upon a dichotomy in the rates and services provided. In September 1998, the carriers started openly matching and mirroring each others rates, including accessorials, surcharges,

inland trucking charges and the like. On less-than-truckload commodity items, the rates between the two carriers have been identical since 1998. Rate increases filed by each carrier, as well as newly imposed surcharges and handling charges, have been the same since 1998.

Analysis of the impact of no competition

So, what does the above mean?

It means that there is a disparate rate structure in the marketplace — single shippers may be able to match forwarder rates by using the tariffs, while forwarders cannot compete with large shippers because they are not afforded the same contracts based on volumes. The ocean carriers, despite my repeated attempts, refuse to negotiate contracts with our company.

It means that smaller shippers will pay more than larger shippers, but this is not necessarily bad — the larger the shipment, the cheaper the rate — that is the way it has always worked in transportation. However, the fact that the smaller shippers' forwarders are not entitled to a somewhat less expensive rate because of their volumes, means that the smaller shippers are paying disproportionately more and subsidizing the larger shippers rates.

Because of the way the Jones Act is written, along with the trade lane as Matson has shaped it with their strategies, Matson will continue to fight in Washington to protect its trade lane and the lack of competition within it. As it does so, the dysfunctional level of competition will continue to exist in the routes to the state of Hawaii, and the populace will be paying artificially high prices due to inflated ocean rates caused by a lack of competition between two carriers.

Inherent in the above three items are two facts that have occurred since 1998. First, rate increases on commodity rates that the carriers have made available to the freight forwarders have greatly exceeded the increase on similar commodity of like-type rates made available to those shippers with contracts. Second, the freight forwarder is obligated to quote "over-tariff" prices in order to profit, which means it can't compete with the containerload pricing the ocean carriers have in their tariffs. The result is that the lack of freight forwarder volume pricing blunts or otherwise severely impairs the forwarders ability to compete with the ocean carriers in a two-competitor trade, with only one competitor adequately (indeed excellently) servicing the trade lane.

Solution

What's the solution?

Give the forwarders volume pricing — force the carriers to contract with the forwarders as they do with single shippers.

My opinion is that the rates provided to forwarders are substantially higher than the contract rates that are provided to proprietary shippers-beneficial owners. Additionally, the refusal of Matson and Horizon to provide freight forwarders with volume pricing (such as that which was eliminated in 1998) results in the marginalizing of forwarder competition and adversely impacts the ability of the forwarder to provide a "competitive rate" to shippers, both large and small, as well as increases the costs to both, because of their inabilities to "team up" with the forwarder and use the forwarders volumes to their advantage. It also increases the difference in rates to the public — those without contracts pay much more than those with — at least 20 to 25 percent more according to our studies.

I leave you with this last thought:

The cost of shipping a 40-foot-high cube container of freight-all-kinds freight to and from the West Coast and Hawaii compares to Japan and China (including both to and from

costs, all in, port to port) as follows:

Japan: To Japan, $ 1,175 From Japan, $ 3075 Total: $ 4,250
China: To Hong Kong, $ 730 From Hong Kong, $2,845 Total: $ 3,575
Hawaii: To Hawaii, $6,046 From Hawaii, $4,327 Total: $10,373

These are both the eastbound and westbound FAK rates. As you can see, even if Matson's vessels came back totally empty, which they do not, the pricing offered in the Hawaii trade lane appears to me to be exceptionally high.

On a per nautical mile basis, the pricing is as follows for a round-trip container:
Tokyo: $.439 ($4,250/9,688 nautical miles round trip)
Hong Kong: $.280 ($3,575/12,760 nautical miles round trip)
Hawaii: $2.328 ($10,373/4,456 nautical miles round trip)

Additionally, it is my thought that with the increases in capacity to be introduced into the trans-Pacific trade during 2005 and 2006, shippers will actually see the rates between Asia and the U.S. decline slightly. If history holds true in the Hawaii trade, prices will be increasing and the disparity shown above will actually increase.

What's the cause of these pricing differences?
There is clearly a lack of competition.

Why haven't these pricing differences previously caused any outcry or uproar by a large number of consumers in Hawaii?

This trade lane, as well as the Hawaiian Islands, have evolved and changed tremendously over the past 40 years or so. During that period, Matson has done a good job, albeit at a very high price, of taking care of the islands. As a result, as the scenario has evolved, there has been almost a "willful indifference " to accept the pricing Matson dictates, given the other alternatives the islanders have available.

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Oregon Dept. of Agriculture

Application Of The COSTWISE Container AT/B To The Movement of Oregon Produce/Products Along The West Coast

Presented By:

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CT Marine, Inc.

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Background:

The author,his firm, and a remowned design team have developed a totally new line of AT/B designs, that build on 25 years of experience in the AT/B marketplace. Currently, the firm has either directly designed, or been a fully participating engineering partner, for 33 operational AT/B's in the US market. Given that experience, we set out with our partners, CT Marine, and Taisei Engineering, to develop a totally new AT/B design. It was designed with three goals in mind – the highest possible speeds at the reasonable horsepower, increased maneuverability and controllability, and ship-quality design and construction. The goal, was to advance the art of AT/B design. Based on new concepts, and not old technology, the COSTWISE AT/B is a true advancement of the art, not a simple redesign of what we have always done in tug and barge design. It is the result of a clean sheet of paper, filled in with the vast experience of three of the world's authorities on AT/B design. While other designs claim to be state of the art, the COSTWISE is demonstrably unique and superior to a simple update of old technology.

The application of the COSTWISE design to coastwise movement of products of the State of Oregon, was studied and a design created that is a baseline for the type of vessel that could significantly relieve pressure on the current north/south rail and highway corridors of the West Coast. Designed for much higher speeds than older towed barges, with greatly increased weather reliability, the AT/B represents a major innovation in dry cargo shipping. It promises to bring with it the huge productivity and reliability increases that the concept delivered to the transport of oil and chemical products in Coastwise and International service.

A container AT/B for Moving Oregon Produce

CT Marine and Ocean Tug & Barge Engineering Corp., were contracted to develop a conceptual design for a container AT/B that would be able to move products and produce from Oregon, to points south along the coast. The new AT/B had to be state of the art with regard to speed, container handling, crew safety and accommodation, protection of the marine and air environment, and able to operate in all weather. The capacity of the barge had to be such, that the number of containers moved not only worked for container movements inside the U.S., but also could serve as a feeder vessel for export cargoes.

In order to be truck and rail competitive, a speed of 13 to 14 knots fully laden, was set as a design target. In as much as the authors were tank-testing just such a design at the time of the Contract, the considerable experience gained in those tests was directly applicable to the Oregon unit. Therefore, this report is fully up to speed on the latest advances in AT/B design.

The report will deal with three principal subjects:

1. The Oregon Vessel
2. The fuel consumption, and environmental protection/mitigation features of the proposed unit.
3. A discussion of the AT/B in general, to allow the reader to understand the vessel type proposed.

A container AT/B for Moving Oregon Produce – The Barge

Vessel Type	Full Cellular Open/Covered
Length Overall	655'-0"
Beam Overall	94'-0"
Depth @ Side	40'-0"
Total Containers – 40 ft.	718
Total Containers In Hold	500
Total Deadweight @ 65,000#/Container	20,834 LT
Approx. Mean Draft At Full Load	23'-0"
Approx. Ballast Capacity	12,000 LT
Approx. Ballast Draft	17'-0"

A container AT/B for Moving Oregon Produce – The Tug

Vessel Type	Ocean AT/B Tug ABS Class A1
Length Overall	150'-11"
Beam Overall	51'-0"
Depth @ Side	26'-0"
Total Propulsion HP	12-14,000
Fuel Specification Options	No2 Diesel or IFO 380
Total Crew	7 to 9 Persons
Approx. Mean Draft At Full Load	23'-0"
Approx. Fuel Capacity	355,000 GAL
Automation Level	Reduced-Manned Engine Room
Connection System – Tug to Barge	Intercon
Sea State of Pushed Operation	8M Sig. Height *
Main Engines	2 x EMD 16-265H (#2 fuel)
	Wartsila, MAN or Bergen IFO 380

(* Reduced power required above 8 M)

Fuel Consumption - #2 Diesel Fuel Version

Tug Propulsion @ 100% Throttle:	12,115 gal./day (24 hours)
Tug Generators	210 gal./day
Tug Incinerator	11 gal./day
Total Tug Fuel @ 100% Power	12,336 gal./day
Barge Generator Fuel – No Refrig. Containers	105 gal./day
Barge Generator Fuel – with 200 Refrig. Containers	1,441 gal./day (6.5kW/per box.)*

** Power for containers can come from either ships' service generators, or from portable power packs that occupy cell space on the barge.*

Fuel Consumption – IFO 380 Fuel Version

Tug Propulsion @ 100% Throttle:	12,311 gal./day (24 hours)
Tug Generators	210 gal./day (#2 diesel)*
Tug Incinerator	11 gal./day (#2 diesel)*
Total Tug Fuel @ 100% Power	12,311 gal./day IFO 380
	221 gal./day (#2 diesel)*
Barge Generator Fuel – No Refrig. Containers	105 gal./day (#2 diesel)*
Barge Generator Fuel – with 200 Refrig. Containers	1,441 gal./day (6.5kW/per box.)* (#2 diesel)

** Generators will run on #2 diesel if separate units. If shaft generators are installed with Controllable Pitch Propellers for the IFO 380 engine package, gen. fuel comes out of the main engine total, however available engine power is decreased proportionately)*

Emissions Issues – HFO Engines

The tug's main engines should be chosen on the basis of being Tier 2 compliant. This goes for both main engines and generator sets. Presently, no IFO-fueled main engine we know of is actually is Tier 2 compliant. The EMD 710G7 and 265H propulsion engines are Tier 2 compliant. General Electric also has a marine diesel engine meeting Tier 2. The reason these engines are available is because both GE and EMD are locomotive manufacturers and thus have had Tier 2 emissions on their radar screen for quite a while. They run on #2 diesel fuel, and not IFO 380, or "heavy" fuel. Therefore, a discussion on the merits and problems associated with burning heavy fuels in tugs is very important. There are also new issues that have come to the fore recently about the problems mixing ultra-low sulfur fuels with low sulfur fuels. See our paper on HFO plants in tugboats.

The Green Tug

The AT/B tug presented has a number of features to make it more environmentally-friendly. The most prominent are listed below:

1. Double-hulled or double-sided protected fuel tanks .
2. Sewage treatment system and gray water hold capability.
3. Onboard incinerator to dispose of trash and fuel filters, sludge, etc.
4. Overflow capture system to prevent spills when fueling.
5. Full high, and high-high level alarm system for fuel tanks.
6. Ballast-exchange capability at sea.
7. Tier-2 compliant main engines and generators.
8. Considerably larger than-normal rudders to provide greater maneuverability in narrow channels.
9. Full electronic navigation suite.
10. Full fire detection and firefighting systems aboard, with redundancy for critical ship systems.
11. FM200 fire extinguishant for machinery spaces to preserve life.

What Is the AT/B™?

The AT/B™, is an all-weather-capable, performance-oriented tug/barge marine transportation system based on proven technology, designed to operate with the same weather and schedule reliability of a ship, at a significantly lower capital and operational cost without sacrificing safety. The key element in the success of this technology is the mechanical connection system, which links the tug and barge together in a solid, single-degree-of-freedom configuration – and – in addition, the tugboat is ocean tow-capable in **ALL** loading conditions.